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(54) ELECTROLYTIC CHROMATE TREATED STEEL SHEET EXCELLENT IN COLOR TONE

(57)Abstract:

PURPOSE: To produce an electrolytic chromate treated steel sheet excellent in a color tone after coating and printing, in order to obtain an attractive can body.

CONSTITUTION: This steel sheet is an electrolytic chromate treated steel sheet in which, as the roughness of the steel sheet in a sheet width direction, Ra (average roughness) is ≤0.37μm and also the number of peaks of a roughness curve per inch at ±3μm cut level, PPI/0.6μm is regulated to ≤250 and, further, the product of Ra and PPI (Ra×PPI) is regulated to 5-80. By this method, the electrolytic chromate treated steel sheet excellent in color tone can be obtained. Moreover, for electrolytic chromate treatment, sulfric acid bath, fluoride bath, etc., now in use, can be used.

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CLAIMS

[Claim(s)]
[Claim 1] The electrolysis chromate treatment steel plate with which average-of-roughness-height Ra was excellent in the color tone characterized by for 0.30 micrometers or less, and the number PPI of peaks per inch in **0.3-micrometer cut / 0.6 micrometers being 250 or less, and Ra, PPI / 0.6-micrometer product RaxPPI being 5-80 as roughness of the direction of the board width of a steel plate.
[Claim 2] The electrolysis chromate treatment steel plate which excelled [term / whose RaxPPI / 0.6 micrometers are 5-25 / of claim / 1st] in the color tone of a publication.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the electrolysis chromate treatment steel plate (Tin Free Steel, common name TFS) used as a material for containers. Furthermore, it is related with the electrolysis chromate treatment steel plate excellent in the color tone after paint / printing in detail.
[0002]
[Description of the Prior Art] Although the electrolysis chromate treatment steel plate (Tin Free Steel, common name TFS) is widely used as a charge of can container material, usually it is painted and used. Since the display of contents, a packer, etc., i.e., a trademark design, is especially printed by can external surface, from the image clarity of a trademark design, or the point of a color tone, the coating containing the white pigments called the White coat is painted, and many print on it in many cases. However, also when a trademark design good in color tone also has how to twist the White coat, it performs the clear paint called a size coat and prints on it, it is plentifully.
[0003] When a trademark design is printed after giving the White coat, the own color tone of an electrolysis chromate treatment steel plate does not not much pose a problem from the masking effect of white pigments, but when a trademark design is printed after performing clear paint, since there is no masking effect, the own color tone of an electrolysis chromate treatment steel plate of a substrate poses a big problem. Therefore, it is necessary for the color tone of a trademark design to stabilize quality, in order that the difference of few own color tones of a steel plate, to be used, may do big effect. And the problem of a surface color tone is gaining in the importance as visual quality about brightness or a tint in recent years. then, the front face of a steel plate -- the attempt which develops the material the surface color tone excelled [material] in improving description, for example, surface roughness, more is indicated by JP,6-33294,A etc.
[0004]
[Problem(s) to be Solved by the Invention] However, the whitish ingredient as a color tone is liked in many cases, and, for this reason, an improvement of the own color tone of an electrolysis chromate treatment steel plate is desired strongly. This invention aims at offering the good electrolysis chromate treatment steel plate of a color tone in order to obtain the can which has a beautiful trademark design in view of the actual condition mentioned above.
[0005]
[Means for Solving the Problem] Average-of-roughness-height Ra is [the number PPI of peaks per inch in 0.30 micrometers or less and **0.3 micrometer cut] 250 or less as roughness of the direction of the board width of a steel plate, and Ra, PPI / 0.6-micrometer product RaxPPI / 0.6 micrometers of this invention are the electrolysis chromate treatment steel plates which are 5-80.
[0006]
[Function] Hereafter, this invention is explained to a detail. Finally the quality of the color tone of the material for containers serves as vision decision of human being. However, it is required to express as a certain physical quantity technically, and there is a method of evaluating a color tone with a colorimeter

or a color difference meter as the means. As this evaluation approach, the observation include angle is said for an observation include angle to have [45 degrees and an incident light include angle / the measured value in 0 degree] correlation comparatively with vision evaluation of human being at 45 degrees at 45 degrees for the incident light include angle in the direction of the board width of a steel plate. Then, evaluation of the color tone in this invention adopted the above-mentioned means.

[0007] First, the color tone of an electrolysis chromate treatment steel plate is explained. Although it is in the purpose of this invention obtaining the electrolysis chromate treatment steel plate which was excellent in the color tone after paint / printing as mentioned above, it is ** by an artificer's etc. examination to depend for the color tone after this paint / printing on the color tone of an electrolysis chromate treatment steel plate fundamentally in the case of the coating which does not contain a pigment. Therefore, in order to improve the color tone after paint / printing, it is necessary to improve the own color tone of an electrolysis chromate treatment steel plate. Since the object color is fundamentally peculiar and it is decided by the spectral reflectance including a metal, also in an electrolysis chromate treatment coat, it will have a certain fixed value.

[0008] Therefore, a color tone will change with locations observed by what kind of allocation the reflected light is. For example, JIS Since the roughness eye of a reduction roll is generally imprinted by the steel plate when a color tone is seen with the method of presentation of L*, a*, and b* as the method of presentation of the object color specified by Z8729, If the color tone of the direction of the board width has high L* value by which for example, an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 45 degrees, L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 0 degree has the inclination which becomes low. Therefore, since what has high L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 45 degrees has little scattered light, it does not look it white to see from a top to appearance, but since there is much specular reflection light, image clarity is good.

[0009] On the contrary, since the ingredient with high L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 0 degree has much scattered light, it looks it white to see from a top to appearance, but since there is little specular reflection light, image clarity is inferior. Therefore, in order to make whiteness and image clarity combine, it cannot be overemphasized that it is necessary to make high L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 45 degrees, and L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 0 degree. In order to make high each above-mentioned L* value and to make a color tone good, the artificer etc. considered the effect which the roughness of a steel plate has on a color tone. The contents shown in Table 1 about the surface finish of an electrolysis chromate treatment steel plate are JIS. It is standardized by G3315 and manufactured according to this specification.

[0010]

[Table 1]

表 1　表面仕上げ区分

	記号	区分	特徴
1回圧延製品	B	ブライト仕上げ	目の細かい砥石目のある滑らかな表面仕上げ
	R	粗面仕上げ	一定方向の砥石目が見られる表面仕上げ
	M	マット仕上げ	ダル状表面仕上げ
2回圧延製品	R	粗面仕上げ	一定方向の砥石目が見られる表面仕上げ

[0011] However, the above-mentioned JIS is what standardized the condition of surface finish, and is not what standardized the concrete condition as steel plate roughness. According to the examination results, such as an artificer, when average-of-roughness-height Ra made the number PPI of peaks per

inch in **0.3-micrometer cut / 0.6 micrometers 250 or less and set Ra, PPI / 0.6-micrometer product to 5-80 by 0.30 micrometers or less as roughness of the direction of the board width of a steel plate, it found out that the purpose of this invention was attained. As mentioned above, in the case of the coating which does not contain a pigment, it depends for the color tone of paint / printing material and a bright film laminated wood on the color tone of an electrolysis chromate treatment steel plate fundamentally..

[0012] In order for paint / printing material and a bright film laminated wood to present a beautiful printing appearance, L* value is said with the need to express the color tone of a steel plate with L* value 35 or more. So, this invention prescribed the conditions for filling it by making the L* value 35 into a valuation basis. As roughness of the direction of the board width of a steel plate, average-of-roughness-height Ra limits to 0.30 micrometers or less. Although the reason has high L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 0 degree by 0.3 micrometers or more, its L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 45 degrees is low, and since it becomes a blackish appearance as a whole, it is because it is not desirable. Moreover, it will become that in which the appearance after paint / printing also became blackish.

[0013] Next, the number of peaks per inch in **0.3-micrometer cut (PPI / 0.6 micrometers) is made or less into 250 as roughness of the direction of the board width of a steel plate. The reason is the same as that of the above, and although L* value by which PPI of the scattered light increases in number in 250 **, an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 0 degree is high, L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 45 degrees is low, and since it becomes a blackish appearance as a whole, it is not desirable.

[0014] Furthermore, in this invention, the numeric value calculated as Ra, PPI / 0.6-micrometer product which displayed average roughness by mum is limited to 5-80. Although L* value by which this numeric value of a flat part increases too much in less than five steel plate, an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 45 degrees is high, L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 0 degree will become low, and the optimal color tone is not acquired. On the other hand, this numeric value has low L* value from which an incident light include angle is measured at 45 degrees, and an observation include angle is measured by the above and reverse at 45 degrees with the steel plate of 80 **, L* value by which an incident light include angle is measured at 45 degrees, and an observation include angle is measured at 0 degree will become high, and the too optimal color tone is not acquired. As for RaxPPI / value of 0.6 micrometers, five to 70 or less are preferably good, and the optimal range is 5-25.

[0015] As a means to obtain the electrolysis chromate treatment steel plate of this invention, it is making roughness of a steel plate into the proper range. With the roll of the temper rolling used also as adjustment of the degree of hardness of a steel plate, the surface finish of the steel plate mentioned above also combines surface finish, and is usually performed. Therefore, it is important to select the roll roughness of this temper rolling roll carefully, for example, the small thing of average-of-roughness-height Ra which has the comparatively few number PPI of roughness crests is desirable on the Dahl front face. Although it is better to avoid since it is difficult to obtain the steel plate of this invention a little when it is the temper rolling roll of surface texturing used as a configuration to which a roughness crest becomes long in the rolling direction of a steel plate, achievement is possible because it is cautious of roll roughness enough. Moreover, as plating processing conditions, the approach of common knowledge, such as a sulfuric-acid bath and a fluoride bath, can be applied, and it does not limit especially.

[0016]

[Example] Hereafter, it is explained concretely that the effectiveness of this invention is also at an example. Using 0.25mm cold rolled sheet steel, after annealing, the temper rolling roll which has various surface roughness performed temper rolling, and surface finish was performed. Electrolysis chromate treatment is performed succeedingly and it is amount of chromium metals 90 mg/m2. Amount

of hydration chrome oxide 15 mg/m2 It galvanized. in this way, the color tone of the obtained electrolysis chromate treatment steel plate -- the direction of the board width -- the Nippon Denshoku spectrum -- the incident light include angle measured the color tone [in / include angle / 45 degrees (45-45" measurement) and / incident light / include angle / observation / in an observation include angle / 2 degrees] whenever [40 degree (45-40" measurement) and angle-of-visibility] at 45 degrees by 45 degrees with the formula color difference meter (MSP-sigma 90). The result was shown in Table 2. Furthermore, after performing 6-7 micrometers of size paint by desiccation thickness, printing of gold and red was performed and macro-scopic observation of the color tone was carried out. This invention presented the color tone with good gold and red. The color tone especially 25 or less steel plate excelled [color tone] in RaxPPI / value of 0.6 micrometers was presented. Color tones were not easy to differ towards the color tone after printing of comparison material being a dark-color tone, and gold and red looking at it to it.

[0017]

[Table 2]

表 2

No.	鋼板粗度			色調測定結果		備考
	Ra (μm)	PPI	Ra×PPI	45−0° 測定	45−45° 測定	
1	0.21	35	7.35	44.2	56.9	本発明
2	0.19	65	12.35	35.3	58.7	
3	0.24	176	42.24	50.0	46.3	
4	0.21	127	23.67	47.7	64.5	
5	0.27	213	57.51	52.6	38.5	
6	0.28	238	66.64	69.9	35.7	
7	0.29	283	82.07	76.3	30.1	比較例
8	0.36	298	107.28	78.1	28.6	
9	0.19	17	3.28	15.7	70.8	

[0018]

[Effect of the Invention] The electrolysis chromate treatment steel plate of this invention has a good color tone, and since it has not said that a color tone changes with directions moreover seen, beautiful paint / printing appearance is acquired. Therefore, it is the outstanding ingredient which can respond to consumer needs.

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(54)【発明の名称】　色調の優れた電解クロム酸処理鋼板

(57)【要約】

【目的】　本発明は、美麗な缶体を得るために、塗装・印刷後の優れた色調を有する電解クロム酸処理鋼板を提供すること。

【構成】　鋼板の板幅方向粗度として、Ｒａ（平均粗さ）が０．３μｍ以下、±０．３μｍカットレベルにおける１インチ当たりの粗度山ピーク数ＰＰＩ／０．６μｍが２５０以下、かつＲａとＰＰＩの積（Ｒａ×ＰＰＩ）が５～８０である電解クロム酸処理鋼板。これにより、色調の優れた電解クロム酸処理鋼板が得られる。また、電解クロム酸処理としては、現行の硫酸浴、フッ化浴等が適用できる。

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【特許請求の範囲】

【請求項１】　鋼板の板幅方向の粗度として、平均粗さＲａが０．３０μｍ以下、±０．３μｍカットでの１インチ当たりのピーク数ＰＰＩ／０．６μｍが２５０以下で、かつＲａとＰＰＩ／０．６μｍの積Ｒａ×ＰＰＩが５～８０であることを特徴とする色調の優れた電解クロム酸処理鋼板。

【請求項２】　Ｒａ×ＰＰＩ／０．６μｍが５～２５である請求項第１項に記載の、色調の優れた電解クロム酸処理鋼板。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、容器用素材として用いられる電解クロム酸処理鋼板（ Tin Free Steel 、通称ＴＦＳ）に関するものである。更に詳しくは、塗装・印刷後の色調が優れた電解クロム酸処理鋼板に関するものである。

【０００２】

【従来の技術】電解クロム酸処理鋼板（ Tin Free Steel 、通称ＴＦＳ）は、缶容器用材料として広く使用されているが、塗装を施されて使用されるのが通常である。特に缶外面には内容物やパッカー等の表示、即ち商標デザインが印刷されるため、商標デザインの鮮映性や色調の点から、多くはホワイトコートと呼ばれる白色顔料を含む塗料が塗装され、その上に印刷を行う場合が多い。しかし、ホワイトコートのない方が色調的に良い商標デザインもあり、サイズコートと呼ばれるクリアー塗装を施し、その上に印刷を行う場合も多々ある。

【０００３】ホワイトコートを施した後商標デザインが印刷される場合は、白色顔料の隠蔽効果から電解クロム酸処理鋼板自身の色調が問題となることは余りないが、クリアー塗装を施した後商標デザインが印刷される場合は、隠蔽効果がないため下地の電解クロム酸処理鋼板自身の色調が大きな問題となる。従って、商標デザインの色調は、使用する鋼板自身のわずかな色調の差が、大きな影響を及ぼすため品質を安定させることが必要となっている。そして、表面色調の問題は、明るさや色合いに関する視覚的な品質として、近年その重要性が増している。そこで、鋼板の表面性状、例えば表面粗度を改良することで、表面色調がより優れた素材を開発する試みは、例えば特開平６－３３２９４号公報などで開示されている。

【０００４】

【発明が解決しようとする課題】しかし、色調としては白っぽい材料が好まれる場合が多く、このため電解クロム酸処理鋼板自身の色調の改善が強く望まれている。本発明は、前述した実状に鑑み、美麗な商標デザインを有する缶体を得るため、色調の良好な電解クロム酸処理鋼板を提供することを目的としたものである。

【０００５】

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【課題を解決するための手段】本発明は、鋼板の板幅方向の粗度として、平均粗さＲａが０．３０μｍ以下、±０．３μｍカットでの１インチ当たりのピーク数ＰＰＩが２５０以下で、かつＲａとＰＰＩ／０．６μｍの積Ｒａ×ＰＰＩ／０．６μｍが５～８０である電解クロム酸処理鋼板である。

【０００６】

【作用】以下、本発明について詳細に説明する。容器用素材の色調の良否は、最終的には人間の視覚判断となる。しかし、技術的には何らかの物理量として表現することが必要で、その手段として測色計または色差計等で色調を評価する方法がある。この評価方法として、鋼板の板幅方向における、入射光角度が４５°で観察角度が４５°及び入射光角度が４５°で観察角度が０°での測定値が人間の視覚評価と比較的相関があると言われている。そこで、本発明における色調の評価は、上記の手段を採用した。

【０００７】まず、電解クロム酸処理鋼板の色調について説明する。本発明の目的は、前述したように塗装・印刷後の色調に優れた電解クロム酸処理鋼板を得ることにあるが、この塗装・印刷後の色調は、顔料を含まない塗料の場合、基本的には電解クロム酸処理鋼板の色調に依存することが、発明者等の検討で明かとなっている。従って、塗装・印刷後の色調を良くするためには、即ち電解クロム酸処理鋼板自身の色調を良くする必要がある。金属を含め、物体色は基本的には固有であり、それは分光反射率によって決まるため、電解クロム酸処理皮膜の場合もある一定の値を持つことになる。

【０００８】従って、反射光がどういう配分になっているかで、観察する位置により色調は異なることになる。例えば、ＪＩＳ　Ｚ８７２９で規定されている物体色の表示方法としてＬ＊、ａ＊、ｂ＊の表示方法で色調を見た場合、一般に、鋼板には圧延ロールの粗度目が転写されるため、板幅方向の色調は、例えば入射光角度が４５°で観察角度が４５°で測定されるＬ＊値が高いと、入射光角度が４５°で観察角度が０°で測定されるＬ＊値は低くなる傾向を有している。従って、入射光角度が４５°で観察角度が４５°で測定されるＬ＊値が高いものは、散乱光が少ないため、上から見ると見た目には白く見えないが、正反射光が多いため、鮮映性は良い。

【０００９】逆に、入射光角度が４５°で観察角度が０°で測定されるＬ＊値が高い材料は、散乱光が多いため上から見ると見た目には白く見えるが、正反射光が少ないため、鮮映性は劣る。従って、白さと鮮映性を兼備させるためには、入射光角度が４５°で観察角度が４５°で測定されるＬ＊値と、入射光角度が４５°で観察角度が０°で測定されるＬ＊値を高くする必要があることは言うまでもない。上記の各Ｌ＊値を高くして、色調を良好とするために、発明者等は鋼板の粗度が色調に与える影響を検討した。電解クロム酸処理鋼板の表面仕上げに

ついては、表1に示す内容がＪＩＳ　Ｇ３３１５に規格化されており、この規格に準じて製造されている。

＊【００１０】
＊　【表１】

表１　表面仕上げ区分

	記号	区分	特徴
１回圧延製品	B	ブライト仕上げ	目の細かい砥石目のある滑らかな表面仕上げ
	R	粗面仕上げ	一定方向の砥石目が見られる表面仕上げ
	M	マット仕上げ	ダル状表面仕上げ
２回圧延製品	R	粗面仕上げ	一定方向の砥石目が見られる表面仕上げ

【００１１】しかし、上記のＪＩＳ規格は、表面仕上げの状態を規格化したもので、鋼板粗度としての具体的状態を規格化したものではない。発明者等の検討結果によれば、鋼板の板幅方向の粗度として、平均粗さＲａが０．３０μｍ以下で、±０．３μｍカットでの１インチ当たりのピーク数ＰＰＩ／０．６μｍを２５０以下とし、かつＲａとＰＰＩ／０．６μｍの積を５～８０とすることにより、本発明の目的が達成されることを見いだした。前述したように、塗装・印刷材及び透明フィルム積層材の色調は、顔料を含まない塗料の場合、基本的には電解クロム酸処理鋼板の色調に依存する。

【００１２】塗装・印刷材及び透明フィルム積層材が美麗な印刷外観を呈するには、鋼板の色調をＬ＊値で表すとＬ＊値は３５以上は必要と言われている。そこで、本発明ではＬ＊値３５を評価基準として、それを満たすための条件を規定した。鋼板の板幅方向の粗度として、平均粗さＲａが０．３０μｍ以下に限定する。その理由は、０．３μｍ以上では入射光角度が４５°で観察角度が０°で測定されるＬ＊値が高いが、入射光角度が４５°で観察角度が４５°で測定されるＬ＊値が低く、全体として黒っぽい外観になるため、好ましくないためである。また、塗装・印刷後の外観も黒ずんだものとなってしまう。

【００１３】次に、鋼板の板幅方向の粗度として、±０．３μｍカットでの１インチ当たりのピーク数（ＰＰＩ／０．６μｍ）を２５０以下とする。その理由も上記と同様で、ＰＰＩが２５０超では散乱光が多くなり、入射光角度が４５°で観察角度が０°で測定されるＬ＊値が高いが、入射光角度が４５°で観察角度が４５°で測定されるＬ＊値が低く、全体として黒っぽい外観になるため、好ましくない。

【００１４】更に、本発明では、平均粗度をμｍで表示したＲａとＰＰＩ／０．６μｍの積として求められる数値を、５～８０に限定するものである。この数値が５未満の鋼板では、平坦部が多くなり過ぎて、入射光角度が４５°で観察角度が４５°で測定されるＬ＊値は高いが、入射光角度が４５°で観察角度が０°で測定されるＬ＊値が低いものとなってしまい、最適な色調は得られない。一方、この数値が８０超の鋼板では、上記と逆に※入射光角度が４５°で観察角度が４５°で測定されるＬ＊値が低く、入射光角度が４５°で観察角度が０°で測定されるＬ＊値は高いものとなってしまい、やはり最適な色調は得られない。Ｒａ×ＰＰＩ／０．６μｍの値は、好ましくは５～７０以下が良く、最適な範囲は５～２５である。

【００１５】本発明の電解クロム酸処理鋼板を得る手段としては、鋼板の粗度を適正な範囲にすることである。前述した鋼板の表面仕上げは、通常、鋼板の硬度の調整としても使用される調質圧延のロールで表面仕上げも併せて行われる。従って、この調質圧延ロールのロール粗度を厳選することが肝要で、例えばダル表面で平均粗さＲａは小さく、また粗度山の数ＰＰＩも比較的少ないものが望ましい。鋼板の圧延方向に、粗度山が長くなるような形状となる、粗面仕上げの調質圧延ロールの場合は、本発明の鋼板を得るのは若干難しいため避けた方が良いが、ロール粗度に十分注意をすることで達成は可能である。また、めっき処理条件としては、硫酸浴やフッ化浴など周知の方法が適用でき、特に限定するものではない。

【００１６】

【実施例】以下、実施例でもって本発明の効果を具体的に説明する。０．２５ｍｍの冷延鋼板を用い焼鈍後、種々の表面粗度を有する調質圧延ロールで調質圧延を行い、表面仕上げを行った。引き続き電解クロム酸処理を行い、金属クロム量９０ｍｇ／ｍ² 水和酸化クロム量１５ｍｇ／ｍ² のめっきを行った。こうして得た電解クロム酸処理鋼板の色調を板幅方向について、日本電色製の分光式色差計（ＭＳＰ－Σ９０）にて、入射光角度が４５°で観察角度が４５°（４５－４５°測定）及び入射光角度が４５°で観察角度が４０°（４５－４０°測定）、視野角度２°における色調を測定した。その結果を表２に示した。更に、サイズ塗装を乾燥厚みで６～７μｍ行った後、ゴールド、赤の印刷を行い色調を肉眼観察した。本発明は、ゴールド及び赤共に良好な色調を呈した。特に、Ｒａ×ＰＰＩ／０．６μｍの値が２５以下の鋼板は優れた色調を呈した。それに対し、比較材の印刷後の色調は、ゴールド及び赤が黒ずんだ色調で、また見る方向で色調は異なり良くなかった。

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【0017】　　＊　＊【表2】

表　2

No.	調板粗度			色調測定結果		備考
	Ra (μm)	PPI	Ra×PPI	45－0°測定	45－45°測定	
1	0.21	35	7.35	44.2	56.9	本発明
2	0.19	65	12.35	35.3	68.7	
3	0.24	176	42.24	50.0	46.3	
4	0.21	127	23.67	47.7	64.5	
5	0.27	213	57.51	52.6	38.5	
6	0.28	238	66.64	69.9	35.7	
7	0.29	283	82.07	76.3	30.1	比較例
8	0.36	298	107.28	78.1	28.6	
9	0.19	17	3.28	15.7	70.8	

【0018】

【発明の効果】本発明の電解クロム酸処理鋼板は、良好な色調を持ち、しかも見る方向によって色調が異なると※20※言ったこともないため、美麗な塗装・印刷外観が得られる。従って、消費者ニーズに応えられる優れた材料である。